



Shell Oil Products US

Puget Sound Refinery

P.O. Box 622

Anacortes, WA 98221

Tel 360.293.0800

Fax 360.293.0808

Email pugetsound@ShellOPUS.com

Web-Plant www.shellpugetsoundrefinery.com

Web-Corporate www.shellus.com

April 23, 2013

Director, Air Enforcement Division
Office of Regulatory Enforcement
U.S. Environmental Protection Agency, Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001

Subject: *United States v Equilon Enterprises, LLC*
Civil Action Number H-01-0978
Southern District of Texas entered August 21, 2001

Flaring Incident Report – March 24, 2013
Shell Oil Products US, Puget Sound Refinery

Dear Sir or Madam:

Pursuant to Section VIII, Paragraph 136 of the consent decree in *United States v Equilon Enterprises LLC*, Civil Action Number H-01-0978, entered August 21, 2001 by the United States District Court for the Southern District of Texas, Shell Oil Products US submits the following information regarding a Hydrocarbon Flaring Incident, as defined in Paragraph 120(f), that occurred at the Puget Sound Refinery. The incident was investigated and a detailed report listing the root causes is included in the attached Incident Report.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and that I have made a diligent inquiry of those individuals immediately responsible for obtaining the information and that to the best of my knowledge and belief, the information submitted herewith is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any comments or questions regarding this information, please contact Tim Figgie at (360) 293-1525.

Sincerely,

Thomas J. Rizzo
General Manager

Enclosure

PSR0000596

cc (w/enclosures):

Director, Air Enforcement Division
U.S. Environmental Protection Agency
c/o Matrix Environmental & Geotechnical Services
120 Eagle Rock Avenue, Suite 207
East Hanover, NJ 07936

Director
NWCAA
1600 South 2nd Street
Mount Vernon, WA 98273

John Keenan
Office of Air Quality (OAQ-107)
US EPA – Region 10
1200 Sixth Avenue
Seattle, WA 98101

FLARING INCIDENT REPORT

Type of Incident: ☐ Acid Gas / SWSG ☐ Tail Gas ☒ Hydrocarbon

Brief Description of Incident:

On March 24 at approximately 11 AM, two very narrow holes were found in the Fluidized Catalyst Cracking Unit (FCCU) reactor riser crossover. The holes were discovered through proactive unit monitoring and the FCCU was immediately shutdown, safely. As part of the emergency shutdown procedures, the light products from the FCCU were routed to the flares resulting in higher Hydrogen Sulfide (H₂S) analyzer readings in the gasses flared. This also resulted in indications of flaring of more than 500 lbs of Sulfur Dioxide (SO₂) in a 24-hour period.

The cause of leak is suspected to be sulfidation and erosion of the pipe due to a failure of the inner refractory lining. Refractory is a hardened material similar to concrete that protects the pipes from sulfidation (corrosion due to high temperature sulfur containing material) and the abrasive FCCU catalyst. It is suspected that a piece of the refractory broke away from the pipe exposing the metal and allowing for the leak.

When the FCCU was shutdown, light hydrocarbon streams from the other operating units were routed directly to the Flare Gas Recovery Unit (FGR). When the FCCU was then restarted (after completing the repairs) on March 26, the additional load on the FGR overwhelmed the system with liquid hydrocarbons and gasses which caused the amine absorber to carryover treating solvent; this resulted in high H₂S readings on the flare gas analyzer and indications of flaring of more than 500 lbs of SO₂ in a 24-hour period.

The hydrocarbons sent to the FGR during the event were a mixture that contained butanes. When the FGR compressors picked up the butane rich gas it condensed to a liquid in the FGR amine absorber tower causing the tower to fill with hydrocarbon. The hydrocarbons lowered the efficiency of the amine to remove H₂S from the flare gases. When this condition occurred, the Operators immediately took action to stop the hydrocarbons being routed to the absorber by stopping the FCCU startup process to stabilize the FGR system. The Hydrotreater Unit 1 (HTU1) and Vacuum Pipe Still (VPS) rates were reduced to eliminate flaring while the second attempt was made to restart the FCCU; the FGR system was restarted after the hydrocarbons were removed, and the H₂S analyzer readings in the flare gas returned to a normal range.

The SO₂ limit of 1000-ppm (corrected to 7% excess air) 1-hour average was not exceeded during either the shutdown or startup events.

Incident Start Date:	3/24/2013	Incident Start Time:	11:00 AM
Incident End Date:	3/28/2013	Incident End Time:	11:30 AM

Estimated Sulfur Dioxide Emissions: (Attach below):	450.0	Pounds
SO ₂ lbs/hr = 0.995*(flare gas flow, MSCFH * 1000) * (Sulfur, vol% / 100) * (64.0648/379), where 0.995 is flare efficiency, 64 #/#-mole is the MW of SO ₂ and 379 is scf/#-mole		

Steps taken to limit the duration and/or quantity of sulfur dioxide emissions:

The FCCU was shutdown to stop the FCCU reactor riser crossover leak. Operations stopped the FCCU startup process and reduced feed rates on the HTU1 and VPS units to minimize the impacts to the FGR system.

ANALYSIS OF INCIDENT AND CORRECTIVE ACTIONS

No additional information attached

Primary and contributing causes of incident:

The initiating root cause of this event is suspected to be the failure of the refractory lining in the FCCU reactor riser crossover that required a unit shutdown to repair.

Analyses of measures available to reduce likelihood of recurrence (evaluate possible design, operational, and maintenance changes; discuss alternatives, probable effectiveness, and cost; determine if an outside consultant should be retained to assist with analyses):

To prevent a reoccurrence of this event Operations will investigate the possibility of routing the HTU1 column overhead gases to the other hydrocarbon recovery systems to remove condensable hydrocarbons from flare gases. Operations will also review startup/shutdown procedures to determine if other measures can be done to prevent this type of incident.

Description of corrective action to be taken (include commencement and completion dates):

See above.

If correction not required, explain basis for conclusion:

See above.

The incident was the result of or resulted in the following (check all that apply):

- ☐ Error from careless operation
- ☐ Equipment failure due to failure to operate and maintain in accordance with good engineering practice
- ☒ Sulfur dioxide emissions greater than 20 #/hr continuously for three or more consecutive hours
- ☐ Caused the number of Acid Gas or Tail Gas incidents in a rolling twelve-month period to exceed five
- ☐ None of the above

Was the root cause identified as a process problem isolated within an SRP?

- ☐ Yes (An optimization study of the affected SRP is required as part of the corrective actions identified above.)
- ☒ No

The root cause of the incident was:

- ☒ Identified for the first time since March 21, 2001
- ☐ Identified as a recurrence since March 21, 2001 (explain previous incident(s) below)

Was the root cause of the incident a malfunction?

- ☒ Yes (describe below)
- ☐ No

The initiating root cause of this event is suspected to be the failure of the refractory lining in the FCCU vertical riser piping.

Definition of Malfunction: *Any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or failure of a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.*

REPORTING REQUIREMENTS

Submit initial report, supporting documents and assessment of stipulated penalties, if any, within 30 days of the incident to the EPA Regional Office and Northwest Clean Air Agency.

If at the time the first report is submitted (within 30 days of the incident), corrective actions have not been determined a follow-up report is required within 45 days of first report (unless otherwise approved by the EPA). Provide anticipated date of follow-up report.

Stipulated penalties do not apply to hydrocarbon flaring events.

Prepared By: _____ James Stellar _____ Date: _____ April 15, 2013 _____



Shell Oil Products US

Puget Sound Refinery

P.O. Box 622

Anacortes, WA 98221

Tel 360.293.0800

Fax 360.293.0808

Email pugetsound@ShellOPUS.com

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Web-Corporate www.shellus.com

October 29, 2014

Director, Air Enforcement Division
Office of Regulatory Enforcement
U.S. Environmental Protection Agency, Mail Code 2242-A
1200 Pennsylvania Avenue, N.W.
Washington, D.C. 20460-0001

Subject: *United States v Equilon Enterprises, LLC*
Civil Action Number H-01-0978
Southern District of Texas entered August 21, 2001

Hydrocarbon Flaring Incident– March 24, 2013 Corrective Action Follow-up
Shell Oil Products US, Puget Sound Refinery

Dear Sir or Madam:

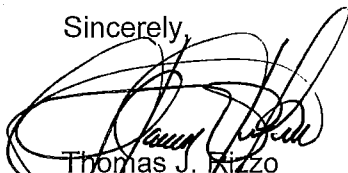
Pursuant to Section VIII, Paragraph 136 of the consent decree in *United States v Equilon Enterprises LLC*, Civil Action Number H-01-0978, entered August 21, 2001 by the United States District Court for the Southern District of Texas, Shell Oil Products US submits the following information regarding a Hydrocarbon Flaring Incident, as defined in Paragraph 120(f), that occurred at the Puget Sound Refinery.

This letter is to confirm that the corrective action identified for the above referenced flaring incident, reported to your office in a letter dated April 23, 2013 has been completed. The corrective action review determined that routing HTU1 overhead gases to the CRU1 recovery section to remove condensable hydrocarbons will be done to prevent a reoccurrence. Startup/Shutdown procedures were also reviewed. These actions were completed on June 18, 2014.

I certify under penalty of law that I have personally examined and am familiar with the information submitted herein and that I have made a diligent inquiry of those individuals immediately responsible for obtaining the information and that to the best of my knowledge and belief, the information submitted herewith is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

If you have any comments or questions regarding this information, please contact Tim Figgie at (360) 293-1525.

Sincerely,



Thomas J. Rizzo
General Manager

on behalf of Tom Rizzo

PSR0000601

cc :

Director, Air Enforcement Division
U.S. Environmental Protection Agency
c/o Matrix Environmental & Geotechnical Services
120 Eagle Rock Avenue, Suite 207
East Hanover, NJ 07936

Director
NWCAA
1600 South 2nd Street
Mount Vernon, WA 98273

John Keenan
Office of Air Quality (OAQ-107)
US EPA – Region 10
1200 Sixth Avenue
Seattle, WA 98101